

# ROM Fitting Instructions

There are now a number of different versions of the BBC microcomputer which are slightly different (BBC B, BBC B+, Master and Compact). Some have additional ROM boards fitted, which these instructions will not attempt to explain, since it is assumed details will have been supplied by the various manufacturers. If there are any additional instruction sheets in your package then they should take priority.

## *Switch Off Your Machine Before Proceeding!*

It may be necessary, when fitting your new ROM, to rearrange the existing ROMs in your machine. When the BBC micro is accessing ROMs, it looks at each one in turn, starting at ROM number 15 (the highest priority ROM) and working down to ROM number 0. In the individual sections explaining each machine, the internal ROM number(s) will be given for each physical socket.

There are two types of ROM which can be fitted in the BBC range of Microcomputers, though both look physically identical:

1. **Language ROMs** :- BASIC, WORDWISE PLUS, INTER-SHEET, INTER-CHART, INTER-BASE, INTER-WORD, SPELL-MASTER, MEGA-3 etc.
2. **Service or Utility ROMs** :- DFS, ADFS, DISC DOCTOR, SPEECH ROM, PRINTMASTER, etc.

Removal of any ROM is best achieved by placing a screwdriver under the ends of the ROM and gently twisting.

## Fitting a Language ROM

'Languages' on the BBC Micro need not be languages at all, but can in fact be packages such as word-processors, spreadsheets, databases etc. When the BBC Micro is first switched on (or after pressing CTRL-BREAK) it will look at each socket in turn until it finds a language ROM. Therefore, placing a particular ROM in a higher priority socket than any other language ROM will ensure that it is selected at switch-on.

## Fitting a Service or Utility ROM

Most service or utility ROMs may be plugged into any socket. However, the relative positions of some ROMs may affect the way they work. Some ROMs use the same \* commands, so the highest priority ROM will always respond to a given \* command first. If a utility ROM needs a particular priority, the instructions supplied with ROM should provide details.

# Inserting ROMs

After re-arranging the existing ROMs, the new ROM can be fitted. Fitting ROMs is very unlikely to cause damage to the computer, but a simple mistake of inserting the chip the wrong way round is almost certain to damage the chip.

**When inserting, make sure that the small notch at one end of the ROM is pointing in the same way as all the other chips in the machine.**

On an original BBC machine they should point to the back of the machine. On a Master or a Compact the notch should be pointing to the left hand edge of the machine.

ACCELERATOR and INTER-SHEET packages contain two ROMs. When installing both ROMs, their relative order of priority does not matter and they need not be next to each other. Note that these products are also available in 32k ROMs which will occupy just one socket in a BBC B Plus or internally in a Master.

## Configuring a Master or Compact

The Master and Compact allow the user to specify the default language ROM using the command **\*CONFIGURE LANG n**, where n is the socket containing the required ROM. This command will not take effect until CTRL-BREAK is pressed or the machine is turned on. For more details see the Welcome guide.

## Sockets in a BBC B

To access the ROM sockets, remove the cover by unscrewing the four screws (two on the back and two underneath at the front), lift the cover and unscrew the keyboard. On the bottom right-hand side of the main circuit board you will find the ROM sockets (see fig.1). For reference we shall label these A to D. BASIC (serial number ending in B01 or B05) is usually found plugged into socket D.

On a standard machine the sockets A to D are ROM numbers 15 to 12, so socket A (on the far right) is the highest priority. When a sideways ROM extension board is fitted, sockets A to D usually become ROM numbers 3 to 0, and the sockets on the extension board become the higher priority sockets.

## Sockets in a BBC B+

To access the ROM sockets, remove the cover by unscrewing the four screws (two on the back and two underneath at the front) and lift the cover. On the top left-hand side of the main circuit board you will find the ROM sockets (see fig.2). For reference we shall label these A to E.

The ROM sockets on the BBC B+ are 32k sockets and each has two ROM numbers: A is 10 and 11, B is 8 and 9, C is 6 and 7, D is 4 and 5, E is 2 and 3. Each socket also has a link associated with it: A has link 18, B link 15, C link 12, D link 11 and E link 9. These links tell the machine whether a particular socket contains a 32k ROM (link set EAST) or a 16/8k ROM (link set WEST). If the link is set WEST then the socket is the odd number (i.e. socket A becomes ROM number 11).

Normally the BASIC ROM, which is combined with the Operating System, is mapped into ROM numbers 14 and 15, so the computer will always start up in BASIC. Changing link 13 (see fig.2) to the SOUTH position will make the BASIC ROM appear in sockets 0 and 1, so there can be a choice of start up language.

## Sockets in a Master

To access the ROM sockets, remove the cover by unscrewing the four screws underneath. On the right-hand side of the main circuit board you will find the ROM sockets (see fig.3). For reference we shall label these A to C. The Master machine also has two cartridge slots which we shall label D and E.

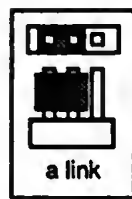
Just above the ROM sockets there is a single chip which contains the Operating System, BASIC, ADFS, DFS and other bundled software. All these occupy ROM numbers 9 to 15. ROM numbers 0 to 3 are mapped to the cartridge slots (D and E) leaving ROM numbers 4 to 8 for sockets A, B and C. Socket A holds ROM numbers 6 and 7, socket B holds ROM number 8 and socket C holds ROM numbers 4 and 5. Normally, sockets A and C are ignored, and sideways RAM is mapped into sockets 4-7. In order to plug ROMs into sockets A and C, links have to be changed. For socket A, link 19 should be set EAST. For socket C, link 18 should be set EAST. If either of these links is set west, than that particular socket will be ignored in favour of sideways RAM.

## Sockets in a Compact

To access the ROM sockets, remove the cover by unscrewing the four screws underneath. On the left-hand side of the main circuit board you will find the ROM sockets (see fig.4). For reference we shall label these A to D.

Just below the ROM sockets there is a single chip which contains the Operating System, UTILS, BASIC and ADFS. This occupies ROM numbers 9 to 15. ROM sockets A, B and C can hold 8/16k ROMs and have the following ROM numbers: A is 8, B is 3 and C is 2. If link 11 is set to the SOUTH position, socket D can hold a 32k ROM and has the ROM numbers 0 and 1. If the link is set NORTH then these sockets will be read from the expansion connector. The 4 banks of sideways RAM are mapped to ROM numbers 4,5 and 6,7.

# ROM POSITIONS



BBC B

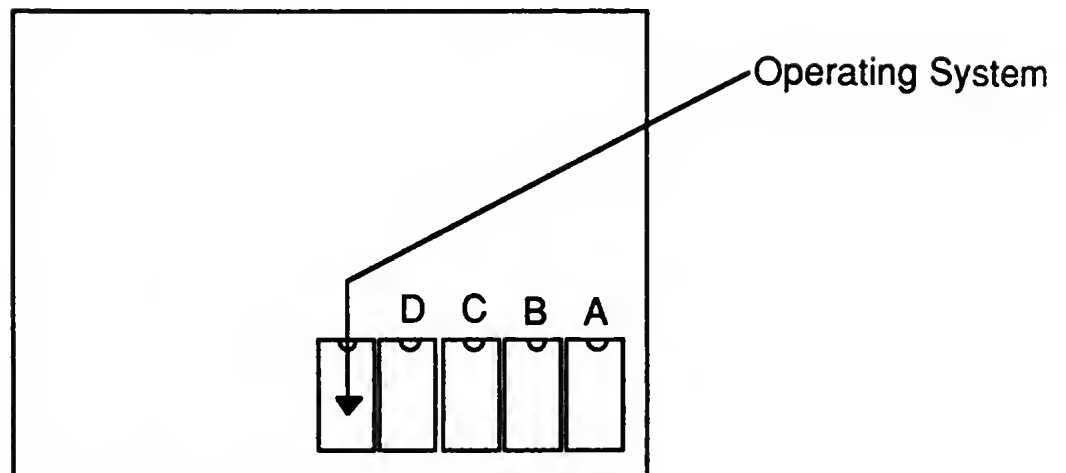


Fig.1

BBC B +

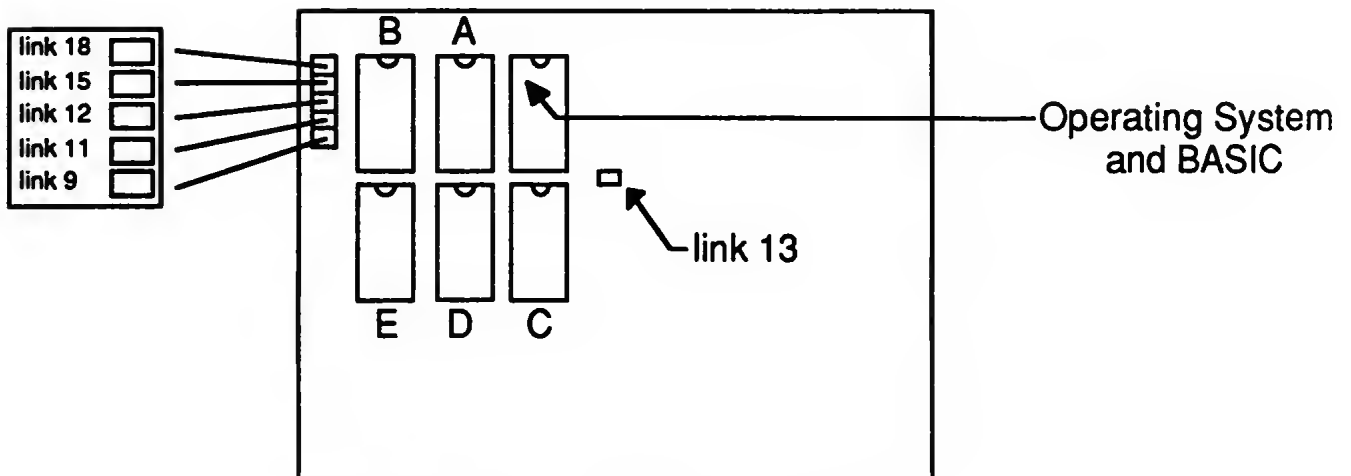


Fig.2

# ROM POSITIONS

## Master

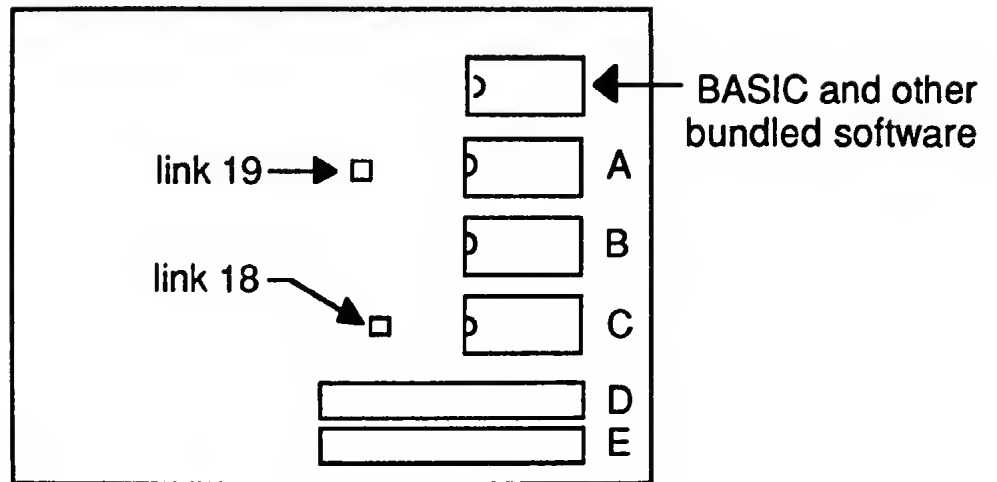


Fig.3

## Master Compact

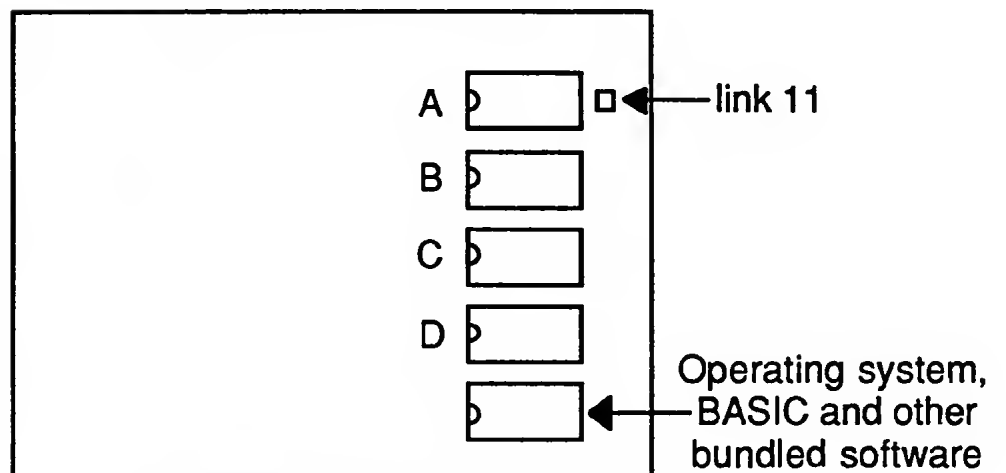


Fig.4

# Cartridge slots in the Master

As an alternative to taking apart your Master, ROMs can be inserted into cartridges which plug into the slots on the top of the machine. These cartridge slots are mapped to ROM numbers 0 to 3. Empty cartridges are available from your local dealer. The current version of the Acorn cartridge is unable to accept ROMs which are mounted on a carrier board e.g. INTER-WORD, SPELLMASTER, INTER-BASE, MEGA-3 etc. If you wish to fit these ROMs externally then you will require a cartridge such as those sold by Care Electronics or Watford Electronics, (addresses are listed below). The present cartridges are unable to accept 32k ROMs which are not on carrier boards.

## ROMs on a carrier board

Some ROMs such as INTER-BASE and INTER-WORD are larger than 16k. These ROMs are supplied on a carrier board so they are taller than usual, and they appear like a 16k ROM to the computer. Any links that may have to be changed, as detailed in the relevant section above, should be set as though a normal 16k ROM is being used. ROMs such as SPELL-MASTER and MEGA-3 are actually 128k ROMs, although they should also be treated as if they were 16K devices. 128K ROMs are supplied on a slightly longer carrier board. This may cause a problem, so that it might be necessary to raise the carrier board above the obstruction by using one or more 28 pin IC sockets. These should be plugged into the main circuit board before fitting the chip. These sockets are available from component suppliers such as Watford Electronics (address listed below).

Please note that some of the pins are deliberately removed from the carrier boards on which chips are fitted. For example:-

SPELLMASTER and MEGA-3 have 6 pins removed.

INTER-WORD has 1 pin removed.

INTER-BASE has 2 pins removed.

If any of these ROMs fail to function on a ROM extension board or extension socket then fit them into one of the sockets on the main circuit board.

Under no circumstances should the chip be removed from the carrier board.

## Switching on after fitting

When everything is inserted and checked, switch the machine on. The computer should then bleep. If it emits a continuous sound, switch off and re-check that all the pins on the chips have gone into their sockets, making sure that none are underneath. If the fault is still present, contact your nearest BBC dealer. If the computer works normally, typing **\*HELP** should list all

the ROMs fitted into your machine with the exception of BASIC. On the BBC B Plus, Master and Compact the ROMs can be listed by typing **\*ROMS**.

## Damaged ROMs

If you plug your ROM into the socket the wrong way up, it is very likely that you will damage it permanently. It is also possible to break the legs if you force them. We do, however, offer a replacement service for most damaged ROMs at £6 (incl. VAT), or £8 for SPELL-MASTER and MEGA-3 ROMs.

## Temporarily Disabling a ROM

As more and more ROMs are produced it is inevitable that command names will conflict. Any ROM can be disabled by typing  $?(673+n)=0$  where  $n$  is the ROM number, i.e. if ROM number 14 is to be disabled, typing  $?(687)=0$  will disable it. To enable it again just press BREAK.

On a Master and Compact it is possible to disable ROMs to the extent that pressing BREAK, CTRL-BREAK or even switching the machine off does not re-enable it. This is achieved by using **\*UNPLUG**  $n$ , where  $n$  is the desired ROM number. To re-enable the ROM use **\*INSERT**  $n$ . These commands will not take effect until CTRL-BREAK is pressed or the machine is turned on.

## Disclaimer

Computer Concepts accepts no responsibility for any problems or damages arising directly, indirectly or consequentially from the use or misuse of the software and/or associated items and the action of plugging in and/or using one of the ROMs in the machine. If you are in doubt about fitting a ROM please ask your local dealer to do it for you.

### Useful addresses:-

Care Electronics:- 800 St.Albans Rd., Garston, Watford, Herts, WD2 6NL.

Watford Electronics: - Jessa House, 250 Lower High Street, Watford, WD1 2AN.



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## Additional SPELL-MASTER fitting notes

This document is intended to be read in conjunction with the ROM fitting instructions supplied with the SPELL-MASTER package.

The SPELL-MASTER chip should plug into any normal BBC 16K socket but because it is a 32 pin chip and so slightly longer than normal ones, it will overhang the end of the socket. Note that 6 pins have been deliberately cut off and this helps ensure that it can be plugged into any normal 28 pin socket - the end with the notch on should be the end that overhangs. However, on some machines there can be obstructions at the end of the socket that prevent SPELL-MASTER being fitted. If this is the case then it may be necessary to raise SPELL-MASTER above the obstruction by plugging one or more 28 pin sockets into the main circuit board before fitting the chip. These sockets are available from component suppliers such as Watford Electronics.

### ROM PRIORITY

SPELL-MASTER has to claim workspace on machines that have WORDWISE/PLUS or VIEW fitted. In these cases it is preferable for it to be fitted into a lower priority than other ROMs.

There are known problems with versions of Solidisk DFS and ADFS that prevent SPELL-MASTER working unless it is in a lower priority socket. Similarly to work correctly, Watford Shadow RAM board ROMs must be given a higher priority than SPELL-MASTER.

The priority is unimportant when used with INTER-WORD or on a BBC Master or BBC Compact.

### BBC MASTER

The Master has very few internal ROM sockets and unfortunately has only one 16K socket that does not have sideways RAM mapped over it as well. This means that it is not possible to have SPELL-MASTER and WORDWISE or INTER WORD present inside these machines without losing at least 2 banks of sideways RAM. This should not matter too much since there is little software that uses all 64K of sideways RAM.

### INTER-WORD with SPELL-MASTER

Unfortunately, early versions of INTER-WORD will not fully operate with SPELL-MASTER. The more noticeable problem is that the machine will 'hang up' when the Browse window is used from the INTER-WORD menu.

From BASIC type the command:

\*HELP (RETURN)

to list all of the names and version numbers of the ROMs which are present in the machine. If this shows that you have an INTER-WORD 1.00 or 1.01 remove the INTER-WORD chip from the machine (as described in the fitting instructions), package it well and return it direct to Computer Concepts. We will replace it, free of charge, with a new version; replacements are usually despatched by return post. A self-addressed return label will aid a speedy turnaround.